

**IN THE UNITED STATES DISTRICT COURT  
FOR THE NORTHERN DISTRICT OF OKLAHOMA**

STATE OF OKLAHOMA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	Case No. 05-cv-329-GKF(PJC)
	)	
TYSON FOODS, INC., et al.,	)	
	)	
Defendants.	)	

**STATE OF OKLAHOMA'S MOTION IN LIMINE TO PRECLUDE EXPERT  
TESTIMONY OF DEFENDANTS' WITNESS CHARLES COWAN, Ph.D. AND  
INTEGRATED BRIEF IN SUPPORT THEREOF**

Plaintiff, the State of Oklahoma ("the State"), pursuant to Fed. R. Evid. 104 and 702 and, *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), respectfully moves this Court for an order in limine precluding the expert testimony of Defendants' witness Charles Cowan, Ph.D. ("Dr. Cowan") for the reasons set forth below.

**I. Introductory Statement**

Dr. Cowan's experience in performing statistical analysis is limited to the *social sciences*. Prior to his work in this case, Dr. Cowan had no experience in analyzing statistics for the purposes of identifying sources of environmental contamination. Dr. Cowan has admitted that, prior to this case he had never performed an environmental analysis as an expert. Simply put, Dr. Cowan lacks the necessary qualifications to render a reliable opinion in this *environmental* case. Thus, Dr. Cowan's proffered opinions should be precluded. Moreover, Dr. Cowan was unable to properly use the data set provided by the State for a principle component analysis ("PCA") to support his criticisms of Dr. Olsen's PCA analysis. Thus, the underlying premise for his opinion is based on data that was *not* used by Dr. Olsen.

## II. Factual Background

Dr. Cowan submitted an expert report entitled “Rebuttal Report Review of Principal Components Analysis of Data and Review of Inferences about Presence of Biomarkers in the Population of Animals from the Illinois River Watershed.” Dr. Cowan was retained by the integrator defendants to: “provide an opinion regarding the use of principal components analysis by Dr. Olsen . . . and the statistical reliability and value of sampling used both by Dr. Olsen and Dr. Harwood.” *See* Ex. A, p. 2 (Cowan Expert Report). As this Court is aware, the statistical analyses performed by Drs. Olsen and Harwood involved environmental data sets and the identification of sources of environmental contamination.

Dr. Cowan’s education and professional experience includes Bachelor’s degrees in English and Economics, a Master’s Degree in Economics and a Ph.D. in Mathematical Statistics. His professional experience “covers 30 years of research and study in the areas of statistics, economics, and their application to business problems.” Ex. A at p. 2. However, none of these courses of study are related to Environmental Science, none of these courses of study are related to Microbiology, and none of these courses of study are related to Geology, Biology or any other of the hard sciences. *See* Ex. A, at Appendix 1, Appendix 2 and Appendix 3; *See also* Ex. B, Cowan Deposition at pp. 7:9-11, 28:6-9, 29:19-24, 37:21-38:19, 48:1-13, 51:11-21, 69:3-70:6, 375:5-20.

Dr. Cowan’s critique of the State’s witnesses is based solely on his experience in statistics as applied in the *social sciences*. He does claim to have been involved in numerous environmental cases as an *economist*. *See* Ex. B, at p. 28:6-9. However, Dr. Cowan has never performed an analysis involving the sources of contamination in an environmental case. In fact, he admits that this is the first time in his career he has undertaken an analysis of this type. *See*

Ex. B, at p. 29:19-24. Dr. Cowan admits to having never performed an environmental analysis as an expert. *See* Ex. B, at p. 7:9-11. Further, Dr. Cowan admits that he has never performed PCA in an environmental context and has never performed PCA with a dataset similar to Dr. Olsen's. *See* Ex. B at pp. 69:7-70:6.

Dr. Cowan's inexperience in this area is evidenced by his lack of knowledge regarding even the most fundamental aspect of a scientific discipline – knowledge of its terminology. Dr. Cowan critiques Dr. Olsen's use of the term "parameter" when he states, "Dr. Olsen throughout his report confuses the terms parameter and variable. . . . From context, it seems that Dr. Olsen means variable when he says parameter. A parameter is a single value that describes a characteristic of a population, like an arithmetic mean or a sample being observed. These are not interchangeable terms." *See* Ex. A, at p. 40 fn 16. In fact, the term "parameter" as used by Dr. Olsen is a ubiquitous and common term in the environmental sciences which investigate the presence of environmental contaminants. This common usage is evidenced by its inclusion in the USGS National Water Information System. *See* Exhibit C, Exhibit 2 to the Cowan Deposition, USGS National Water Information System Website, (demonstrating the common use of the term parameter in Environmental Science rather than statistical analysis); *See also* Ex. B, at p. 43:2-11 (Dr. Cowan acknowledges that USGS uses the term parameter). This lack of knowledge of even fundamental terms used in this discipline is indicative of the lack of expertise possessed by Dr. Cowan in offering an opinion on the expert reports of Drs. Olsen and Harwood.

While Dr. Cowan purports to offer a critique of Dr. Harwood's work, he admits that he is not a microbiologist, is not an expert in bacteria, and has never designed a field sample to collect bacteria from manure, surface water or groundwater. (Ex. B, at pp. 37:21-38:19). Further, Dr. Cowan admits that he does not know the methodologies of PCR, what effects changes have on

sensitivity of PCR and only knows the function of PCR in layman's terms. *See* Ex. B, at p. 375:5-20. Here, again, Dr. Cowan demonstrates his lack of relevant specialized experience.

Dr. Cowan admits he is not familiar with the Illinois River Watershed (IRW), nor is he familiar with the science involved in this case. In fact, Dr. Cowan admits to having no knowledge of the hydrology or how contaminants move in the environment. *See* Ex. B, at p. 51:11-21. Dr. Cowan attempts to minimize his lack of relevant experience by stating that he was not tasked to render an opinion specifically regarding contamination in the IRW, but rather that he was only tasked to render an opinion regarding the ability of Drs. Olsen and Harwood to draw conclusions from their respective datasets.

Overall, Dr. Cowan would like the Court to believe that "analysis is analysis" and "statistics is statistics" regardless of the scientific context in which it is applied. However, as explained by Dr. Jim Loftis, the specific scientific knowledge required to perform statistical analysis of environmental data is so specialized that it is taught as a separate course from general statistics. *See* Ex. D, ¶ 7, Declaration of Dr. Loftis.<sup>1</sup>

Dr. Cowan further has admitted that his critique of Dr. Olsen's treatment of non-detects was invalid. Originally, Dr. Cowan criticized Dr. Olsen for using the midpoint between zero and the detect limit, rather than zero, for non-detects claiming it would have "have huge effects on the outcome" of Dr. Olsen's PCA runs. *See* Ex. A, Cowan Report at pp. 26 & 32. Later at his deposition, Dr. Cowan changes his opinion and accepts Dr. Olsen's method. *See* Ex. B, at 132:4-11.

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<sup>1</sup> Citations to the Expert Report or Deposition of Dr. Cowan contained therein are attached.

Finally, Dr. Cowan failed to use the correct data sets from Dr. Olsen's data or to follow Dr. Olsen's protocols in his analysis. *See* Ex. E, Decl. of Chappell ¶¶ 8,9, & 11. As stated by Dr. Chappell:

As demonstrated above, Dr. Cowan's lack of experience with environmental data has led him to use an incorrect dataset. Therefore, all of his "key problem" assertions with regard to extraction of data from the main project database and PCA dataset reduction are in fact false. Furthermore, since he has used an incorrect dataset, all of his independent analyses using that dataset, as provided in his Rebuttal Report, are irrelevant and unreliable. Dr. Cowan's lack of experience in environmental science also translates into his irrelevant and unreliable evaluation of Dr. Olsen's application of PCA with respect to the IRW data.

*Id.* at ¶ 11. This means that his foundation for his PCA opinions is flawed.

### III. Legal Standard

Federal Rule of Evidence 702 provides:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness ***qualified as an expert by knowledge, skill, experience, training, or education***, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case. (emphasis added).

Thus, "Fed. R. Evid. 702 imposes on the trial judge an important 'gate-keeping' function with regard to the admissibility of expert opinions." *Ralston v. Smith & Nephew Richards, Inc.*, 275 F.3d 965, 969 (10th Cir. 2001). As an initial matter, the court must determine the expert is qualified by "knowledge, skill, experience, training, or education" to render an opinion. *Id.* As stated in the *In re Williams Sec. Litig.*, 496 F. Supp. 2d 1195, 1232 & 1245 (N.D. Okla. 2007):

[I]t should be borne in mind that "[t]he issue with regard to expert testimony is not the qualifications of a witness in the abstract, but whether those qualifications provide a foundation for a witness to answer a specific question." *Berry v. City of Detroit*, 25 F.3d 1342, 1351 (6th Cir. 1994), *cert. denied*, 513 U.S. 1111, 115 S. Ct. 902, 130 L. Ed. 2d 786 (1995). *See also*, *Wheeling Pittsburgh Steel Corp. v.*

*Beelman River Terminals, Inc.*, 254 F.3d 706, 715 (8th Cir. 2001) ("To begin with, we agree with the district court that Dr. Curtis . . . easily qualifies as an expert under Federal Rule of Evidence 702. The real question is, what is he an expert about?") and *Westfed Holdings, Inc. v. United States*, 55 Fed. Cl. 544, 571 (2003), *rev'd in part on other grounds*, 407 F.3d 1352 (Fed. Cir. 2005). Thus, on the issue of expert qualifications, *Ralston* and like cases establish that the qualifications of the proposed expert are to be assessed only after the specific matters he proposes to address have been identified. The controlling Tenth Circuit cases, exemplified by *Ralston*, establish that the expert's qualifications must be both (i) adequate in a general, qualitative sense (i.e., "knowledge, skill, experience, training or education" as required by Rule 702) and (ii) ***specific to the matters he proposes to address as an expert.*** (emphasis added).

Next, the court must ensure that the scientific testimony being offered is "not only relevant, but reliable." *See Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 589 (1993).<sup>2</sup> "To be reliable under *Daubert*, an expert's scientific testimony must be based on scientific knowledge . . . ." *Dodge v. Cotter Corp.*, 328 F.3d 1212, 1222 (10th Cir. 2003). The Supreme Court has explained that the term "scientific" "implies a grounding in the methods and procedures of science." *Daubert*, 509 U.S. at 590. Likewise, it has explained that the term "knowledge" "connotes more than subjective belief or unsupported speculation." *Id.* Thus, "in order to qualify as 'scientific knowledge,' an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation -- i.e., 'good grounds,' based on what is known." *Id.*

The Supreme Court has set forth four non-exclusive factors that a court may consider in making its reliability determination: (1) whether the theory or technique can be (and has been) tested, *id.* at 593; (2) whether the theory or technique has been subjected to peer review and publication, *id.*; (3) the known or potential rate of error and the existence and maintenance of standards controlling the technique's operation, *id.* at 594; and (4) whether the theory or

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<sup>2</sup> The Supreme Court held in *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999), that the gatekeeping function set out in *Daubert* applies not only to expert testimony based on scientific knowledge, but also expert testimony based upon technical or other specialized knowledge -- i.e., it applies to all expert testimony.

technique has general acceptance in the scientific community, *id.* The inquiry is "a flexible one." *Id.*; *see also id.* at 593 ("[m]any factors will bear on the inquiry, and we do not presume to set out a definitive checklist or test"); *Dodge*, 328 F.3d at 1222 ("the list is not exclusive"). "The focus [of the inquiry]. . . must be solely on principles and methodologies, not on the conclusions that they generate." *Daubert*, 509 U.S. at 595.

To be relevant, the testimony must "assist the trier of fact to understand the evidence or to determine a fact in issue." Fed. R. Evid. 702. This consideration has been described as one of "fit." *See Daubert*, 509 U.S. at 591. "Fit" is not always obvious, and scientific validity for one purpose is not necessarily scientific validity for other, unrelated purposes." *Id.*

In sum, "[t]he objective of [the gatekeeping] requirement is to ensure the reliability and relevancy of expert testimony. It is to make certain that an expert, whether basing testimony upon professional studies or personal experience, employs in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire*, 526 U.S. at 152.

Finally, the party proffering the expert scientific testimony bears the burden of establishing admissibility under the Federal Rules of Evidence and *Daubert*. *See Ralston*, 275 F.3d at 970 fn. 4.

#### **IV. Argument**

##### **A. Dr. Cowan's testimony should be excluded as unreliable because he is unqualified and lacks the requisite knowledge to testify as an expert in this case.**

As a threshold question, before the Court can examine an expert's opinion as to relevance and reliability, it must determine whether that expert is qualified, through education and experience, to offer the opinions they intend to. *Ralston*, 275 F.3d at 969. However, general

qualifications are not sufficient. Instead, Defendants must demonstrate that Dr. Cowan possesses qualifications that are “specific to the matters he proposes to address as an expert.” *In re Williams Sec. Litig.*, 496 F. Supp. 2d at 1232 & 1245. As demonstrated above, Dr. Cowan lacks qualifications that are specific to the environmental issues he proposes to address as an expert. Therefore, Dr. Cowan is unqualified to opine as an expert critiquing the method employed by Dr. Olsen in his principal component analysis (PCA) or Dr. Harwood in her PCR analysis. As such, the Court should preclude his testimony.

**B. Dr. Cowan’s testimony is unreliable because he failed to follow Dr. Olsen’s protocols in replicating the data set for running the PCA.**

Assuming, *arguendo*, that Dr. Cowan is qualified to offer an opinion in this matter his opinion is still unreliable and, therefore, must be excluded. Dr. Cowan’s lack of experience in environmental science affects his opinions and leads to his inability to correctly perform the PCA analysis. *See* Ex. E, Declaration of Richard Chappell ¶ 8.<sup>3</sup> Dr. Cowan claims he was unable to reproduce the data set used by Dr. Olsen. *See* Ex. A, Cowan report at p. 35. In fact, had Dr. Cowan simply followed the explicit protocols Dr. Olsen used, he would have been able to correctly replicate the dataset. *See* Ex. E, Chappell Decl. at ¶ 8.

Dr. Cowan claims that his criticisms of Dr. Olsen’s PCA are valid because he used the same dataset used by Dr. Olsen. However, the “download” Dr. Cowan purports to perform would not, as he opines, have extracted all of the surface water data contained in the master database and used by Dr. Olsen. *See* Ex. E, Chappell Decl. at ¶ 8. This illustrates one of several fundamental mistakes made by Dr. Cowan. Dr. Cowan’s use of the “SW:S” criterion caused him to miss hundreds of data records corresponding to sample splits or replicate analyses that were used as averages by Dr. Olsen in his PCA. *Id.* A competent environmental scientist would have

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<sup>3</sup> Citations to the Expert Report or Deposition of Dr. Cowan contained therein are attached.



understood and realized that such splits/replicates are common, would have recognized them in the database, and would have ensured that they were also extracted. *See* Ex. E, Chappell Decl. at ¶ 8. Furthermore, an environmental scientist in the process of reproducing a dataset would have immediately recognized that the different values obtained for a percentage of the samples could be the result of mishandling of such split/replicate data. *Id.* Dr. Cowan did not recognize this because he has no experience with environmental data or environmental databases. *See* Ex. E, Chappell Decl. at ¶ 8.

Dr. Cowan also chose to ignore parameter key codes denoting Total Phosphorus from Dr. Olsen's work and this resulted in 499 instances where Dr. Cowan had no value for Total Phosphorus. This significantly affected his PCA analysis. Dr. Cowan's error would not have occurred if he had followed the specific protocols used by Dr. Olsen. *See* Ex. A, Cowan Report at p. 38; Ex. E, Chappell Decl. at ¶ 9. Without correct reproduction of the dataset, any critique of Dr. Olsen's report is suspect and likely unreliable because it is not an apples-to-apples comparison. In other words, Dr. Cowan is not actually critiquing Dr. Olsen's work; instead he is critiquing his own PCA based on an imperfect replication of a dataset that is not reflective of Dr. Olsen's methods. *See* Ex. E, Chappell Decl. at ¶ 11. Had Dr. Cowan followed Dr. Olsen's specific protocols he would have been able to reproduce the dataset; however, his inability to follow them renders his critique wholly unreliable and inadmissible under Federal Rule of Evidence 702. "Proposed testimony must be supported by appropriate validation -- *i.e.*, 'good grounds,' based on what is known." *Daubert*, 509 U.S. at 590.

## V. Conclusion

Dr. Cowan, a statistician, opines in areas outside his expertise in this case. His fundamental lack of knowledge in the area in which he attempts to opine is evident from his

misuse of common terminology and research protocols. Further, he has never performed this type of analysis and has never performed an environmental analysis in general. Dr. Cowan's testimony and report are wholly unreliable based on his lack of experience, education and training and as such, should be precluded. In similar fashion, Dr. Cowan made fundamental errors concerning the data he used for his PCA opinions. Thus, they are unreliable and should be excluded.

WHEREFORE, in light of the foregoing, this Court should enter an order in limine precluding the expert testimony of Defendants' witness Dr. Charles Cowan due to his lack of experience and education pertaining to the subject matter on which he intends to opine.

Respectfully Submitted,

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